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How to become an under 11 rescuer: a practical method to teach first aid to primary schoolchildren☆

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Abstract

It has been calculated that, on average, 20% of the population should be trained to provide first aid, if a significant reduction of mortality is to be achieved. However, wide dissemination of the principles of emergency care poses a series of difficulties. As a partial solution, we have designed a first aid training course for children aged 8–11 years in their last three courses at primary school. According to the Italian school system, classes in primary school are indicated as I through V, from start to ending. The course addresses three issues: the broken tooth, nose bleeding and paediatric basic life support (PBLS). The course is divided into 17 didactic modules: each module contains a theoretical lecture, a practical demonstration by the trainer and a session for the trainees to practice under supervision. The aim of the study was to evaluate the benefit of teaching emergency procedures including practical sessions for pupils in primary schools. Four hundred and sixty-nine children were enrolled: the evaluation consisted of a 13 question multiple-choice written test taken at the end of the theoretical session and a semi-structured test at one month. Two hundred and seventy-one children attended to the theoretical lesson only, without going through the practical session (Group A), while the remaining 189 children completed the practical training (Group B). The outcome of the evaluation demonstrates that older children (in their V school class) score better than those in their IV and III class ($p < 0.001$). However, when comparing Group A and Group B in each class, the children that had also been exposed to the practical training (Group B) scored significantly better (V_B versus V_A $p < 0.001$; IV_B versus IV_A $p < 0.001$; III_B versus III_A $p < 0.01$).

In conclusion, this proposed method of teaching emergency first aid could be successful in training primary school children. The permanent integration of the subject into the core curriculum of primary schools, and extended to higher school levels, could help in disseminating the culture of emergency care in the general population.

Keywords: Education; Child; Schools; Basic life support

1. Introduction

In most emergency situations, first aid needs to be administered by a layperson [1]. Even in the most favourable situations, it takes time for trained health care personnel to

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arrive at the scene [2]. The interval between, for example, a cardiac arrest and the start of cardiopulmonary resuscitation, is critical to the survival of the patient [3,4].

The number of laypeople who deliver first aid, after witnessing an accident is still too small [5]. Most of these occasional rescuers have never taken part in a basic life support (BLS) course. Surveys have shown that occasional witnesses attempt resuscitation in less than 30% of cases, so that the number of lives saved is still sub-optimal [6].

In the 1980s, the American Heart Association suggested that morbidity and mortality from cardiac arrest could be significantly reduced if at least 20% of the population were trained to act appropriately in an emergency [7].

Those involved in spreading the culture of how to act in an emergency, face two problems—attitude and learning.

The first problem concerns the need to spread the concept of correct behaviour and basic resuscitation skills to larger section of the population. Consequently, there is a requirement for a teaching method that is applicable on a large scale for people with widely different levels of education. For large-scale training an adequate number of instructors is required. The cost is seldom supported by public institutions and more often weighs on individual citizens or volunteers.

The second problem pertains to reinforce the skills learned to ensure that the behavioural changes induced by the training programme are retained [8]. It also means that the trainees become aware of the social benefit of their knowledge of basic resuscitation skills and the need for frequent refresher training.

In common with other authors [2,9] and the European Resuscitation Council [10], we believe that the most appropriate way to address both problems is to include BLS courses within the school syllabus.

We report on how we have designed a Paediatric Basic Life Support (PBLS) course for primary school children and the results we have achieved using different methods to induce long term learning.

2. Materials and methods

2.1. Course preparation

The course on emergencies for primary school children, involves the combined efforts of paediatricians dealing with emergencies, schoolteachers, psychologists and a designer. It has been named ‘becoming an under 11 rescuer’. The core of the course addresses three issues: ‘the bleeding nose’, ‘the broken tooth’ and ‘paediatric basic life support’ (Fig. 1). The first two issues have been selected because they made possible to introduce the methodology of the course through two kinds of conditions that are frequent and relatively common in school age children. It was then easier for the children to assimilate the third issue, which forms the main goal of the course.

In designing the course we took into consideration the Italian governmental syllabus for primary school teaching [11], in relation to differing child ages and the average levels of knowledge and competence reached by children between 8 and 11 years. Children who had already undertaken the study of body systems and basic physiology in their science programme in primary school classes III, IV and V were admitted to the course. Before the course teachers were encouraged to emphasise the importance of voluntary service and rescue among the general aims in their annual planning.

We used a simulation environment and collaborative learning, introducing two imaginary characters, named ‘Tato’ and ‘Tata’, (designed to suggest a serene atmosphere), and led the children along the process of learning the basic principles of rescue with firmness and scientific rigour (Fig. 2).

The teaching methodology made the pupils identify the two imaginary leading characters with the instructor and through them follow the theory and the rescue manoeuvres that they should repeat later (Fig. 3).

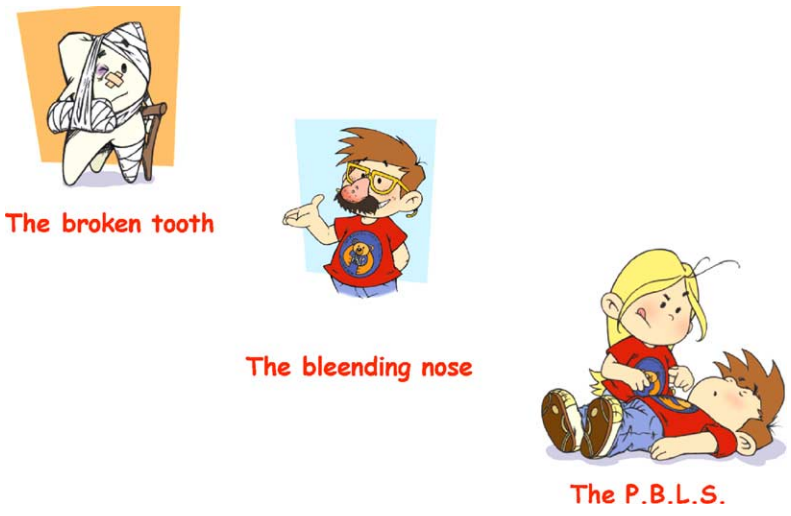

Fig. 1. The three issues in the course.

Fig. 2. Tato and Tata.

The topics were divided into small didactical modules. Each module lasts about 45 min and is further divided into three smaller didactic units, both theoretical and practical. The theory lesson in each unit does not exceed 10 min (Table 1). At the end of each unit of theory the children attention was regained by a demonstration by the instructor and practical training by all participants. The latter was done either on a simulator, or setting up a role-play session where the pupils alternately played patient and rescuer.

To evaluate the influence that practical training exerts on overall learning, a number of children (Group A) did not go through the practical session.

To emphasise the importance of taking part in the course, each child received a copy of the 'handbook of the under 11 rescuer' and at the end the children were awarded a diploma and a badge.

2.2. Assessment of learning

To assess the efficacy of the teaching methodology, and the knowledge and abilities acquired, we used a structured test of 13 multiple-choice questions on the issues dealt with. Further to this, approximately 30 days following the course, the children took a semi-structured test (a descriptive text or a report on the course experience) aimed to evaluate the retention of learning and the need to reinforce it [12].

2.3. Course organisation

In the schools where the course was organized, it was integrated into the school syllabus. Thirty days in advance of the course, a letter notified all parents and written permission was obtained.

Fifteen days before the beginning of the course all teachers in the classes involved underwent a PBLS course, so that they were acquainted with the issues and ready to support the efforts of the instructors.

The actual teaching was done by two instructors in each classroom (1 instructor/9–15 children) with a slide projector

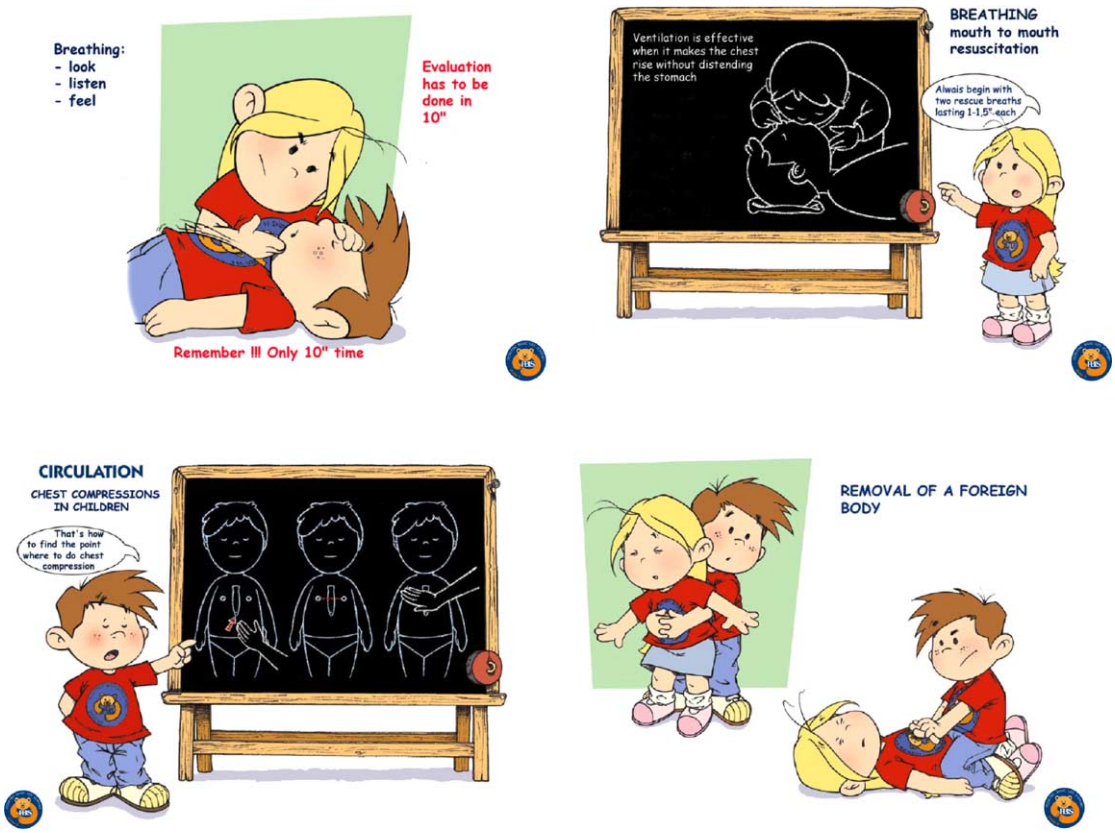

Fig. 3. An example from the 'handbook of the under 11 rescuer'.

Table 1
Modules forming the three main issues of the course

PBLS	Dental trauma	Epistaxis
Heart and lung anatomy	Tooth anatomy	Nose anatomy
Evaluation of the state of consciousness	The milktooth	Causes of epistaxis
Airway maintenance	Permanent teeth	What to do in case of epistaxis
I look, I listen, I feel	Dental trauma	
Recovery position	What to do in case of dental trauma	
Mouth-to-mouth respiration		
Evaluation of cardiac activity		
External chest compressions		
Foreign body extraction		

and two paediatric simulators, supported by a schoolteacher. The instructors were paediatricians with an interest in emergency and trained to instruct on the course.

The course lasted three days. During the first day the 'broken tooth' and the 'nose bleeding' were addressed for a total 4 h.

The second day was devoted to PBLS running from 0900 to 1600 h.

On the third day the children revised the subjects taught during the previous session under tutor supervision and finally undertook the multiple-choice evaluation.

2.4. Participants in the under 11 PBLS

Four hundred and sixty-nine children were enrolled in the study, 214 males and 185 females, with a mean age of 9.76 years (range 8–11 years). Distribution by school class for Group B (to receive practical training) was: level V = 63 pupils (two classrooms); level IV = 83 pupils (three classrooms); level III = 52 pupils (two classrooms). Distribution by school class for Group A (without practical training) was: V = 133 pupils (seven classrooms); level IV = 120 pupils (seven classrooms); level III = 18 pupils (one classroom).

2.5. Statistical evaluation

Assessment of the results was done by the Chi-squared test ($p < 0.01$).

3. Results

Table 2 shows the results in the multiple-choice evaluation test achieved by study Groups (A or B) and school class.

Group B scored significantly better than Group A in any class (V_B versus V_A $p < 0.001$; IV_B versus IV_A $p < 0.001$; III_B versus III_A $p < 0.01$). Both in Group B and in Group A, the number of correct answers by children in school class V was significantly higher than in school classes IV and III ($p < 0.001$).

In both Group B and Group A the number of correct answers by children in school class IV was significantly higher than in school class III ($p < 0.01$).

One month after the course, all the children were asked to describe in writing their course experience: the outcome shows a good retention of knowledge, an accurate description of the PBLS manoeuvres, both in content and time sequences

4. Discussion

The aim was to design a course for teaching primary school children to ensure adequate behaviour in an emergency. Of the three core issues in the course, PBLS was prepared according to current guidelines, adapted to the mental development of an average 8–11-year-old child.

The course method recognises that the ability to retain knowledge is based on the concomitant involvement of several senses. Students retain 10% of what they read, 20% of what they listen to, 30% of what they watch, 50% of what they listen to and watch, and 80% of what they listen to, watch and do [13]. For this reason the course 'how to become an under 11 rescuer' has been built on 17 modules, stimulating children's hearing, sight and manual dexterity, to attain the highest possible retention of knowledge and skills. The modules have been especially designed to attract the attention of 8–11-year-old children, who attend the highest three classes in the Italian primary school system.

We believe that our teaching method based on modules of 10 min theory ('to listen'); 10 min demonstration of manoeuvres by the instructor ('to watch'); 25 min, (possibly more, according to instructor's discretion), training on the simulator ('to do') has proved to be effective in prompting retention of knowledge and skills. To make the most of the learning potential of a primary school pupil, we consider it to be critical that the theory lesson does not exceed 10 min: at that age, learning declines at an average of 30 min.

The children in the two lower primary school classes (6 and 7 years old) were not given the course, as their level of psychomotor development is inadequate, and their comprehension of events is not directly referable to their experience. At this age most children still lack the ability to recognize

Table 2
Correct answers (percent) in the multiple-choice final test

Group	Group B			Group A		
School level	V_B	IV_B	III_B	V_A	IV_A	III_A
Percent of correct answers	100	97.36	93.85	96.525	93.966	88.889

Group B: with pratical training, Group A: without pratical training.

and classify events that are alike to work out solutions to meet the needs [14]. Often they lack also the basic ability to improve the understanding of the concepts. Other authors have reported difficulties in evaluating children aged six to seven, as it was obvious that many could not understand the appropriate terminology [15,16].

The results obtained from the multiple-choice test show that children in their highest school class (level V) have an ability to retain information significantly better than those in class III and IV, regardless of exposure to practical training.

Comparing the method of teaching (with and without practical training) for equivalent school levels, it is apparent that experience with a simulator enhances learning in children significantly, as reported by other authors in similar situations [17].

These findings have confirmed our initial impression that practical training should be an essential part of the course, even if this complicates the organization of a large-scale operation.

The results of the test (at 30 days) indicate that learning can be retained.

We evaluated also the retention of skills in paediatric basic life support on a small sample of children in group B at levels V, IV and III. The outcome as a whole was good, similar to the evaluation of theoretic knowledge, with better performance at level V compared to IV and III.

In conclusion, we believe that this method of teaching the emergency response to children in higher primary school classes, mainly if made an integral part of the syllabus, can induce long-term behavioural changes. We believe that in the future, teaching the emergency response in primary school, especially if refreshing courses are provided in intermediate and secondary school, should increase significantly the percentage of the population trained to face emergency situations or initiate rescue.

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